

BBBBBBB	AAAAAA	L	L	Y	Y
B	A	L	L	Y	Y
B	A	L	L	Y	Y
B	A AA	L	L	Y	Y
BBBBBBB	AAA AAA	L	L	Y	Y
B	A	L	L	Y	Y
B	A	L	L	Y	Y
B	A	L	L	Y	Y
BBBBBBB	A	LLLLLLLL	LLLLLLLL	Y	Y

IIIII	N N	TTTT	EEEE	RRRR	FFFF	AAA	CCCC	EEEE
I	NN N	T	E	R R	F	A A	C	E
I	N N N	T	EEEE	RRRR	FFFF	AAAAA	C	EEEE
I	N NN	T	E	R R	F	A A	C	E
IIIII	N N	T	EEEE	R R	F	A A	CCCC	EEEE

AAAAAA	PPPPPP	PPPPPP	L	EEEEEEEE
A A	P P	P P	L	E
A A	P P	P P	L	E
A AA A	PPPPPP	PPPPPP	L	EEEEEEEE
AAA AAA	P	P	L	E
A A	P	P	L	E
A A	P	P	L	E
A A	P	P	L	E
A A	P	P	LLLLLLLL	EEEEEEEE

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SECTION I. INTRODUCTION.

THIS PACKAGE IS A SYSTEM OF MACHINE LANGUAGE SUBROUTINES THAT ALLOWS AN APPLE II COMPUTER TO COMMUNICATE WITH A BALLY ARCADE. THIS WAS WRITTEN FOR A 48K APPLE II WITH ONE DISK DRIVE. IF YOU HAVE LESS MEMORY, THE MACHINE LANGUAGE ROUTINES ARE EASILY RELOCATED. IF YOU DO NOT HAVE A DISK DRIVE, THE KEYBOARD TO BALLY ROUTINE CAN STILL BE USED.

ATTACHED TO THIS DOCUMENT YOU SHOULD FIND FIVE LISTINGS. THEY ARE AS FOLLOWS:

- 1) DUMP TO BALLY ASSEMBLER LISTING.
- 2) LOAD FROM BALLY ASSEMBLER LISTING.
- 3) KEYBOARD TO BALLY ASSEMBLER LISTING.
- 4) PRINT TINY BASIC ASSEMBLER LISTING.
- 5) APPLESOFT FILE HANDLER.

THERE ARE FOUR ASSEMBLER LISTINGS. YOU MAY ENTER THESE INTO YOUR APPLE THROUGH THE MACHINE LANGUAGE MONITOR OR INTO AN ASSEMBLER. THERE IS ALSO A LISTING OF A BASIC PROGRAM WHICH WILL INTEGRATE THE FOUR ASSEMBLER PROGRAMS INTO A USEFUL FILE HANDLER.

EACH OF THESE ROUTINES IS FULLY DESCRIBED IN THE FOLLOWING SECTIONS OF THIS DOCUMENT.

A WORD ABOUT NOTATION IS IN ORDER. SINCE I COME FROM THE PLANET ARIXIAN AND HAVE SIXTEEN FINGERS, I HAVE USED HEXIDECIMAL ADDRESSING. NUMBERS WHICH BEGIN WITH A "\$" ARE HEXIDECIMAL. THE DECIMAL ADDRESSES OF THE MACHINE LANGUAGE ROUTINES CAN BE PICKED OUT OF THE FILE HANDLER LISTING.

SECTION II. INSTRUCTIONS FOR INSTALLATION.

HERE ARE SOME SIMPLE INSTRUCTIONS TO HELP YOU INSTALL THIS PACKAGE.

- 1) USING AN ASSEMBLER, OR THE APPLE MACHINE LANGUAGE MONITOR KEY IN THE FOUR ASSEMBLER ROUTINES FROM THE LISTINGS.
- 2) SAVE THESE ROUTINES ON DISK AS FOLLOWS
"BSAVE DUMP TO BALLY (\$4800),A\$4800,L\$1F0"
"BSAVE LOAD FROM BALLY (\$4600),A\$4600,L\$1F0"
"BSAVE TYPE TO BALLY (\$4400),A\$4400,L\$1F0"
"BSAVE PRINT BALLY (\$4200),A\$4200,L\$1F0"
- 3) KEY IN THE "FILE HANDLER" PROGRAM. ALTHOUGH THE PROGRAM IS WRITTEN IN APPLESOFT, IT CAN BE CONVERTED TO INTEGER BASIC WITH VERY FEW CHANGES. CHANGE THE "GET" S TO "INPUT" S, AND USE "(CNTRL D)" INSTEAD OF USING CHR\$.
- 4) CONNECT THE BALLY AND THE APPLE. ALL CONNECTIONS ARE MADE THROUGH THE CASSETTE PORTS. UNFORTUNATELY, THE BALLY CASSETTE INTERFACE CANNOT BE DIRECTLY PLUGGED INTO THE APPLE CASSETTE JACKS. THE SIGNALS WILL NOT BE STRONG ENOUGH TO REGISTER. SOME AMPLIFICATION IS REQUIRED. THE SIMPLEST WAY TO DO THIS IS TO USE YOUR CASSETTE RECORDER. TO SEND FROM THE APPLE TO THE BALLY, PLUG THE APPLE OUTPUT INTO THE MICROPHONE JACK. PLUG THE BALLY INTERFACE INTO THE EARPHONE JACK. WHEN THE RECORDER IS ON "RECORD", IT WILL ACT AS AN AMPLIFIER. YOU CAN PUT A TAPE IN AND CAPTURE DATA AS IT IS SENT, OR YOU CAN "FAKE OUT" THE CASSETTE PLAYER BY DEPRESSING THE BUTTON OR SWITCH THAT SENSES THE "NO RECORD" KNOCK-OUT ON THE BACK OF EACH CASSETTE TAPE. PRESS THIS SWITCH WHILE PUSHING THE "RECORD" AND "PLAY" BUTTONS. TO LOAD FROM THE BALLY TO THE APPLE, PLUG THE APPLE CASSETTE INPUT INTO THE EARPHONE JACK AND THE BALLY INTERFACE OUTPUT INTO THE MICROPHONE JACK.
- 5) RUN THE FILE HANDLER. SEE SECTION VII FOR THE DETAILS.

SECTION III. THE "DUMP TO BALLY" ASSEMBLER ROUTINE.

THIS ROUTINE WAS WRITTEN TO RESIDE AT HEX \$4800. THIS CHOICE OF ADDRESS WAS PURELY ARBITRARY ON MY PART. IT IS SIMPLE TO RELOCATE THIS TO ANOTHER ADDRESS IF NECESSARY.

TO RELOCATE THE ROUTINE, FOLLOW THE ASSEMBLER LISTING. IF YOU ARE CHANGING THE LOCATION OF THE DATA BUFFER FROM \$5000, CHANGE THE INSTRUCTIONS USING THIS ADDRESS. IF YOU ARE RELOCATING THE ROUTINE ITSELF, YOU WILL HAVE TO CHANGE THE OBJECT ADDRESSES OF THE "JSR" (JUMP TO SUBROUTINE) AND JMP (JUMP) INSTRUCTIONS SO THAT THEY POINT TO THE NEW RELOCATED ADDRESS.

THIS ROUTINE EXAMINES MEMORY STARTING AT LOCATION \$5000. EACH CHARACTER IS SENT TO THE APPLE CASSETTE OUTPUT PORT. THE ROUTINE ENDS WHEN A \$00 IS ENCOUNTERED IN MEMORY.

IF YOU WANT TO USE THIS ROUTINE SEPARATELY, LOAD THE DATA YOU WANT TO TRANSMIT STARTING AT HEX \$5000. PUT A \$00 AT THE VERY END AND THEN DO A "CALL" OR "JSR" TO HEX \$4800.

SECTION IV. THE "LOAD FROM BALLY" ASSEMBLER ROUTINE.

THIS ROUTINE HAS BEEN WRITTEN TO RUN AT HEX \$4600. AGAIN, IF YOUR APPLE DOES NOT HAVE 48K, IT IS EASY TO RELOCATE THIS TO A LOWER ADDRESS.

THIS ROUTINE LISTENS AT THE APPLE II CASSETTE PORT. THE INCOMING TONES ARE DECODED INTO BITS AND ASSEMBLED INTO BYTES AND STORED IN MEMORY BEGINNING AT HEX \$5000.

THIS ROUTINE WILL END WHEN A BACKWARD SLASH IS DETECTED, "\". AFTER A PROGRAM HAS BEEN LOADED FROM THE BALLY, HIT THE BACKSLASH KEY (AT THE TOP OF THE KEYPAD OVERLAY). THE APPLE WILL EXIT FROM THE INPUT ROUTINE. A HEX \$00 WILL BE STORED AT THE END OF THE PROGRAM. THE ENDING ADDRESS WILL BE IN \$FD AND \$FE.

EACH TIME A CHARACTER IS RECEIVED, THE APPLE SPEAKER WILL CLICK. YOU MAY FIND THIS HELPFUL IF YOU HAVE A PROBLEM SETTING A VOLUME LEVEL.

YOU CAN USE THIS ROUTINE IN YOUR OWN PROGRAMS. JUST ISSUE A "CALL" OR "JSR" TO HEX \$4600. ANY DATA COMING FROM THE BALLY CASSETTE INTERFACE WILL BE LOADED INTO APPLE MEMORY STARTING AT \$5000. TO EXIT, HAVE THE BALLY SEND THE APPLE A BACKSLASH. NOTE THAT IF A BALLY PROGRAM CONTAINS A BACKSLASH IT CANNOT BE PROPERLY LOADED TO THE APPLE.

SECTION IV. THE "KEYBOARD TO BALLY" ASSEMBLER ROUTINE.

THIS ROUTINE HAS BEEN WRITTEN TO RUN AT HEX #4400. AGAIN, IT CAN BE MODIFIED TO RUN AT A LOWER ADDRESS IF NECESSARY. THIS ROUTINE USES THE "DUMP TO BALLY" ROUTINE DISCUSSED EARLIER.

THIS PROGRAM ACCEPTS APPLE KEYBOARD INPUT. EACH CHARACTER IS THEN SENT TO THE BALLY THROUGH THE APPLE CASSETTE OUTPUT. WATCHING THE BALLY, YOU CAN KEY IN PROGRAMS AND DATA VERY QUICKLY. THE BALLY WORDS ARE HANDLED IN A SPECIAL WAY. EACH ALPHABETIC KEYSTROKE IS SENT AS IT IS KEYED IN. WHEN TWO ALPHABETIC CHARACTERS ARE KEYED IN IN A ROW, EXTRA TESTING IS DONE. THE TABLE BELOW SHOWS WHICH KEYS TO PRESS TO TRANSMIT WHICH BALLY WORDS.

YOU KEY IN

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RN
ST
TO
(RETURN)

BALLY RECIEVES

BOX
CLEAR
FOR
GOTO
GOSUB
IF
INPUT
LINE
LIST
NEXT
PRINT
RETURN
RUN
RND
STEP
TO
GO

THIS FEATURE IS DISABLED DURING A PRINT COMMAND. THIS ALLOWS YOU TO TYPE: 10 PRINT "HI THERE" WITHOUT GETTING SOMETHING LIKE: 10 PRINT "HI THERETURN ".

THE FOLLOWING CHARACTERS DO NOT APPEAR ON THE APPLE KEYBOARD AND THEY ARE HANDLED AS INDICATED:

>>>TYPE<<<
ASTERISK
SLASH
LEFT ARROW.

>>>>TO GET<<<<
MULTIPLY SIGN
DIVIDE SIGN
ERASE

THE BRACKETS AND THE ARROWS ARE NOT SUPPORTED BY THIS SUBROUTINE. IF YOU CANNOT SUBSTITUTE PARENTHESSES OR < ETC, YOU WILL HAVE TO KEY THESE IN THROUGH THE BALLY KEYPAD.

THIS ROUTINE IS EXITED BY PRESSING THE SHIFTED "N".

SECTION VI. THE "PRINT TINY BASIC" ASSEMBLER ROUTINE.

THIS ROUTINE IS NORMALLY LOADED AND EXECUTED AT \$4200 IN THE APPLE II. IT WILL EXAMINE APPLE MEMORY STARTING AT \$5000. THE DATA IS INTERPRETED AS A BALLY ARCADE TINY BASIC PROGRAM, AND IT IS PRINTED ON THE APPLE TV. IF YOU HAVE AN APPLE PRINTER, YOU CAN PRODUCE HARD COPY OF YOUR BALLY PROGRAMS. PRESSING ANY APPLE KEY WILL INTERRUPT THE LISTING UNTIL ANOTHER KEY IS PRESSED. THIS WILL ALLOW YOU TO STOP AND GO AS REQUIRED.

THIS ROUTINE WILL EXIT WHEN THE END OF THE PROGRAM (A HEX \$00) IS FOUND.

SECTION VII. THE "FILE HANDLER" PROGRAM.

THIS PROGRAM COMBINES THE FOUR ROUTINES INTO ONE USEFUL SYSTEM. IT HANDLES THE STORAGE AND RETRIEVAL OF TINY BASIC PROGRAMS. WITH THIS PROGRAM YOU CAN DO THE FOLLOWING:

- 1) LOAD A PROGRAM FROM THE BALLY TO THE APPLE DISK.
- 2) DUMP A PROGRAM FROM THE APPLE DISK TO THE ARCADE.
- 3) CATALOG THE DISK.
- 4) TYPE TO THE ARCADE.
- 5) PRINT A TINY BASIC PROGRAM.
- 6) EXIT PROGRAM.

1. LOADING A PROGRAM FROM THE BALLY TO APPLE DISK.

PRESS RETURN ON THE APPLE AND THEN KEY IN :PRINT;LIST ON THE BALLY. THE APPLE SPEAKER WILL SLOWLY CLICK INDICATING THAT IT IS RECEIVING DATA. WHEN THE PROGRAM LISTING IS COMPLETED, HIT THE BACKSLASH KEY ON THE BALLY. THIS SIGNALS THE APPLE THAT THE LISTING IS COMPLETE. YOU SHOULD ALSO KEY IN :RETURN. YOU WILL BE ASKED IF YOU WANT TO STORE THIS PROGRAM. IF YOU DO NOT ANSWER "N", YOU WILL BE ASKED FOR A DISK FILE NAME. THE FILE HANDLER PROGRAM WILL STORE THE DATA AS A BINARY FILE FROM \$5000 TO THE END OF THE TINY BASIC PROGRAM.

2. DUMPING FROM THE DISK TO THE ARCADE.

WHEN YOU CHOOSE THIS OPTION YOU WILL BE ASKED FOR A PROGRAM NAME. APPLE DOS WILL READ THAT BINARY FILE (TO \$5000) AND YOU WILL BE ASKED TO HIT ANY KEY TO CONTINUE. ENSURE THAT YOU HAVE CORRECTLY CONNECTED THE RECORDER, HIT ":INPUT" ON THE BALLY, AND THEN PUSH ANY APPLE KEY. THIS WILL CAUSE THE "DUMP TO BALLY" PROCEDURE TO BE CALLED. WHEN THE LOAD IS COMPLETE, YOU WILL BE RETURNED TO THE MAIN MENU.

3. CATALOGING A DISK.

THIS PERFORMS A NOMAL DOS CATALOG OF THE CURRENT DISK. THIS IS USEFUL IF YOU HAVE A QUESTION ABOUT SPELLING OF A FILE NAME.

4. TYPING TO THE BALLY.

YOU MAY NOW KEY IN DATA ON THE APPLE KEYBOARD. IT WILL GO OUT THE APPLE CASSETTE TO THE BALLY CASSETTE INTERFACE. THE DATA WILL NOT PRINT ON THE APPLE SCREEN, ONLY ON THE BALLY TV SCREEN. SEE THE SECTION ON THE TYPER FOR HOW TO SEND BALLY KEYWORDS. TO RETURN TO THE MENU, TYPE A SHIFTED "N".

5. LISTING A TINY BASIC PROGRAM.

THE FILE HANDLER PROGRAM WILL ASK YOU IF THE PROGRAM IS LOADED. YOU MUST ANSWER "Y" OR "N". IF IT WAS JUST LOADED IT FROM THE BALLY, YOU CAN ANSWER "Y". IF YOUR ANSWER IS "N", YOU WILL BE ASKED TO ENTER THE NAME OF THE DISK FILE PROGRAM. THAT FILE WILL BE LOADED. THE LISTING SUBROUTINE AT \$4200 WILL BE CALLED. IF YOU HAVE A PRINTER, A HARDCOPY CAN BE PRODUCED. HITTING ANY KEY WILL HALT THE LISTING UNTIL ANOTHER KEY IS DEPRESSED.

SECTION VIII. MOTIVATION.

THE FILE HANDLER PROGRAM IN THIS PACKAGE HANDLES BALLY TINY BASIC PROGRAMS. HOWEVER, THE ASSEMBLER ROUTINES CAN ALSO BE USED TO PASS DATA BACK AND FORTH BETWEEN THE TWO MACHINES. HERE ARE TWO SIMPLE EXAMPLES.

EXAMPLE 1. TELL THE APPLE WHEN TRIGGER ONE ON THE BALLY IS PRESSED.

APPLE PROGRAM

```
20 D$=CHR$(4)
30 PRINT D$
40 PRINT D$:"BLOAD LOAD FROM BALLY ($4600)"
50 CALL 17920
60 PRINT "YOU GOT ME":GOTO 50
```

BALLY PROGRAM

```
20 :PRINT
30 IF TR(1)=0GOTO 30
40 PRINT"\ "
50 FOR A=1TO 40:NEXT A
60 GOTO 30
```

EXAMPLE 2. GIVE THE BALLY THE VALUE OF PDL (0).

```
20 D$=CHR$(4)
30 PRINT D$
40 PRINT D$:"BLOAD DUMP TO BALLY ($4800)"
50 A$=STR$(PDL(0))
60 FOR X=1TO LEN(A$)
70 POKE 20479+X,VAL(MID$(A$,X,1))+48
80 NEXT X
85 POKE 20479+X,13
90 POKE 20480+X,0
100 CALL 18432
110 FOR X=1TO 2000:NEXT X: GOTO 50
```

```
10 CLEAR
30 INPUT A
40 PRINT "VALUE IS ",A
50 GOTO 30
:INPUT : RUN
```

=END==END==END==END==END==END==END==END==END==END==END==END==END==